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0295. Induction and repression effects of heat shock (HS) and LPS and modulatory effects of glutamine on blood mononuclear cells -hsprotein-72 from icu patients with severe sepsis, trauma and healthy controls

E Briassouli[1*], M Tzanoudaki[2], G Daikos[1], K Vardas[3], M Kanariou[2], C Routsi[3], S Nanas[3], G Briassoulis[4]

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Introduction

In severe sepsis (SS) or trauma-related systemic inflammatory response syndrome (SIRS), induction of heat-shock-protein-72 (HSP72) may protect cells from stress.

Objectives

We compared the heat-shock (HS) with the lipopolysaccharide (LPS) induction/repression effect on HSP72 of peripheral blood mononuclear cells (PBMCs) in SS or SIRS patients and healthy-controls (H) and investigated any possible modulating glutamine (Gln) effect.

Methods

PBMCs from 16/H, 11/SS, and 7/SIRS were incubated with 1μg/ml LPS or 43° HS vs. no stimulation for 4h. In each group 3 experiments involved L-Ala-Gln10mM incubation 1h before (Gln-b) or after (Gln-a) induction, or no glutamine (1088 measurements). Intracellular Mean Fluorescence Intensity (MFI) levels of monocytes (mHSP72) or lymphocytes (lHSP72) were determined using Flow Cytometry.

Results

In H-PBMCs, LPS did not affect mHSP72 (79 ± 10 MFI vs. 78 ± 13) or lHSP72 (7 ± 1.7 vs. 7 ± 2). HS induced mHSP72 (454 ± 60, $p < 0.0001$) and lHSP72 (41 ± 7, $p < 0.0001$) with or without Gln ($p < 0.0001$). Basal mHSP72 was higher in SIRS compared to H (144 ± 25 vs. 78 ± 10, $p < 0.03$). A HS-induction effect on SIRS-mHSP72 (394 ± 108, $p < 0.04$) and lHSP72 (37 ± 5, $p < 0.02$) was further enhanced by Gln-b (495 ± 114, $p < 0.01$ and 58 ± 14, $p < 0.04$). LPS suppressed SIRS-mHSP72 (120 ± 54 vs. 144 ± 25, $p < 0.02$) especially in the Gln-b group (107 ± 19, $p < 0.02$). Basal Gln-b mHSP72 in SS was higher compared to H (112 ± 16 vs. 69 ± 10, $p < 0.03$). In SS-PBMCs HS, but not LPS, induced mHSP72 (492 ± 56 vs. 108 ± 19, $p < 0.003$). LPS repressed the SS-lHSP72 (10 ± 2 vs. 17 ± 2, $p < 0.007$) an effect attenuated by Gln-b (13 ± 5).

Conclusions

Heat shock greatly induces mHSP72 and lHSP72 of ICU patients' PBMCs. LPS may repress lHSP72 in septic or trauma patients. Glutamine pre-treatment may either enhance HS-induction or LPS-repression on mHSP72 or attenuate LPS-repression on lHSP72 in SS and SIRS groups.

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Authors' details

[1]1st Department of Propaedeutic InternalMedicine, University of Athens, Athens, Greece. [2]Department of Immunology - Histocompatibility, Specialized Center & Referral Center for Primary Immunodeficiencies - Paediatric Immunology, "Aghia Sophia" Children's Hospital, Athens, Greece. [3]First Critical Care Department, University of Athens, Evangelismos Hospital,

[1]1st Department of Propaedeutic InternalMedicine, University of Athens, Athens, Greece
Full list of author information is available at the end of the article

Athens, Greece. [4]PICU, University of Crete, University Hospital, Heraklion, Greece.

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